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Confirmation No. 6650

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appeal No. 2007-3397

In re: Steinmann et al.

Serial No.: 10/644,299

Filed: August 19, 2003

For: NANOPARTICLE-FILLED STEREOLITHOGRAPHIC RESINS

Group Art Unit 1732

Examiner: Tentoni, Leo B.

August 29, 2007

Board of Patent Appeals and Interference

US Patent and Trademark Office

PO Box 1450

Alexandria, Virginia 22313-1450

SECOND AMENDMENT AFTER APPEAL UNDER 37 CFR § 41.33(b)

Sir:

Please amend the above-identified application as follows:

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 9 of this paper.

THE REMAINDER OF THIS PAPER INTENTIONALLY LEFT BLANK.

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1. (Currently amended) A process for forming a three-dimensional article by stereolithography, said process comprising the steps:

(a) coating a thin layer of a liquid radiation-curable composition onto a surface, said composition including: ~~at least one filler comprising silica-type nano-particles suspended in the radiation-curable composition~~

(a) at least one free-radical polymerizing organic substance;

(b) at least one free-radical polymerization initiator;

(c) at least one filler comprising silica-type nanoparticles suspended in the radiation-curable composition, wherein said nano-particles are spherical, have a particle size distribution of 10 to 50 nanometers, are not agglomerated, and are surface modified;

(d) optionally, at least one cationically polymerizing organic substance;

(e) optionally, at least one cationic polymerization initiator;

(f) optionally, at least one hydroxyl-functional compound; and

(g) optionally, at least one type of microparticle filler;

(b) exposing said thin layer imagewise to actinic radiation to form an imaged cross-section, wherein the radiation is of sufficient intensity to cause substantial curing of the thin layer in the exposed areas;

(c) coating a thin layer of the composition onto the previously exposed imaged cross-section;

(d) exposing said thin layer from step (c) imagewise to actinic radiation to form an additional imaged cross-section, wherein the radiation is of sufficient intensity to cause substantial curing of the thin layer in the exposed areas and to cause adhesion to the previously exposed imaged cross-section;

(e) repeating steps (c) and (d) a sufficient number of times in order to build up the three-dimensional article.

2. (Cancelled)
3. (Currently amended) The process of claim ~~2~~ 1 wherein component (a) is at least one mono-, di-, tri-, tetra- or pentafunctional monomeric or oligomeric aliphatic, cycloaliphatic or aromatic (meth)acrylate.
4. (Currently amended) The process of claim ~~2~~ 1 wherein component (a) is at least one (meth)acrylate comprises a mono-, di- or tri-functional aliphatic (meth)acrylate compound.
5. (Currently amended) The process of claim ~~2~~ 1 wherein component (a) comprises a mono-functional aliphatic (meth)acrylate compound.
6. (Currently amended) The process of claim ~~2~~ 1 wherein component (a) comprises a di-functional aliphatic (meth)acrylate compound or pentafunctional monomeric or oligomeric aliphatic, cycloaliphatic, or aromatic (meth)acrylate.
7. (Currently amended) The process of claim ~~2~~ 1 wherein component (a) comprises a urethane (meth)acrylate.
8. (Currently amended) The process of claim ~~2~~ 1 wherein component (a) constitutes from about 5% to about 70% by weight of the total liquid radiation-curable composition.
9. (Currently amended) The process of claim ~~2~~ 1 wherein component (b) is 1-hydroxycyclohexyl phenyl ketone or 2,4,6-trimethylbenzoyldiphenylphosphine oxide or a mixture of both.

10. (Currently amended) The process of claim ~~2~~ 1 wherein component (b) constitutes from about 0.1 to about 7% by weight of the total liquid radiation-curable composition.

11. (Cancelled)

12. (Currently amended) The process of claim ~~2~~ 1 wherein component (c) constitutes from about 15% to about 60% by weight to the total resin composition.

13. (Currently amended) The process of claim ~~2~~ 1 wherein component (d) is present and comprises 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate.

14. (Currently amended) The process of claim ~~2~~ 1 wherein component (d) is present and comprises trimethylol propane triglycidylether.

15. (Currently amended) The process of claim ~~2~~ 1 wherein component (d) is present and constitutes from about 10% to about 40% by weight of the total liquid radiation-curable composition.

16. (Currently amended) The process of claim ~~2~~ 1 wherein component (e) is present and is triarylsulfonium hexafluoroantimonate.

17. (Currently amended) The process of claim ~~2~~ 1 wherein component (e) is present and constitutes from about 0.1 to about 8% by weight of the total liquid radiation-curable composition.

18. (Currently amended) The process of claim ~~2~~ 1 wherein additionally comprising at least one (f) hydroxyl-functional compound.

19. (Original) The process of claim 18 wherein component (f) is trimethylol propane.

20. (Currently amended) The process of claim ~~2~~ 1 wherein component (f) is present and constitutes about 1% to about 10% by weight of the total liquid radiation-curable composition.

21. (Cancelled)

22. (Withdrawn) A solid three-dimensional article produced by the process of claim 1.

23. (Withdrawn) A liquid radiation-curable composition useful for the production of three dimensional articles by stereolithography that comprises:

- (a) at least one free-radical polymerizing organic substance;
- (b) at least one free-radical polymerization initiator;
- (c) at least one filler comprising silica-type nanoparticles suspended in the radiation-curable composition;
- (d) at least one cationically polymerizing organic substance;
- (e) at least one cationic polymerization initiator;
- (f) optionally, at least one hydroxyl-functional compound; and
- (g) optionally, at least one type of microparticle filler.

24. (Withdrawn) The composition of claim 23 wherein component (a) is at least one mono-, di-, tri-, tetra- or pentafunctional monomeric or oligomeric aliphatic, cycloaliphatic or aromatic (meth)acrylate.

25. (Withdrawn) The composition of claim 23 wherein component (a) comprises a mono-, di- or tri-functional aliphatic (meth)acrylate compound.

26. (Withdrawn) The composition of claim 23 wherein component (a) comprises a mono-functional aliphatic (meth)acrylate compound.

27. (Withdrawn) The composition of claim 23 wherein component (a) comprises a di-functional aliphatic (meth)acrylate compound or pentafunctional monomeric or oligomeric aliphatic, cycloaliphatic, or aromatic (meth)acrylate.

28. (Withdrawn) The composition of claim 23 wherein component (a) comprises a urethane (meth)acrylate.

29. (Withdrawn) The composition of claim 23 wherein component (a) constitutes from about 5% to about 50% by weight of the total liquid radiation-curable composition.

30. (Withdrawn) The composition of claim 23 wherein component (b) is 1-hydroxycyclohexyl phenyl ketone or 2,4,6-trimethylbenzoyldiphenylphosphine oxide or a mixture of both.

31. (Withdrawn) The composition of claim 23 wherein component (b) constitutes from about 0.1 to about 7% by weight of the total liquid radiation-curable composition.

32. (Withdrawn) The composition of claim 23 wherein component (c) nanoparticles are spherical, have a particle size distribution of 10 to 50 nanometers, are not agglomerated, and are surface modified.

33. (Withdrawn) The composition of claim 23 wherein component (c) constitutes from about 15% to about 60% by weight to the total resin composition.

34. (Withdrawn) The composition of claim 23 wherein component (d) comprises 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate.

35. (Withdrawn) The composition of claim 23 wherein component (d) comprises trimethylol propane triglycidylether.

36. (Withdrawn) The composition of claim 23 wherein component (d) constitutes from about 10% to about 40% by weight of the total liquid radiation-curable composition.

37. (Withdrawn) The composition of claim 23 wherein component (e) is triarylsulfonium hexafluoroantimonate.

38. (Withdrawn) The composition of claim 23 wherein component (e) constitutes from about 0.1 to about 8% by weight of the total liquid radiation-curable composition.

39. (Withdrawn) The composition of claim 23 wherein additionally comprising at least one (f) hydroxyl-functional compound

40. (Withdrawn) The composition of claim 23 wherein component (f) is trimethylol propane.

41. (Withdrawn) The composition of claim 23 wherein component (f) is present from about 1% to about 10% by weight of the total liquid radiation-curable composition.

42. (Withdrawn) The composition of claim 23 wherein the composition comprises:

(a) at least one mono-, di-, tri-, tetra- or pentafunctional monomeric or oligomeric aliphatic, cycloaliphatic or aromatic (meth)acrylate;

(b) at least one free-radical polymerization initiator;

- (c) at least one filler comprising silica nanoparticles suspended in the composition;
- (d) at least one cationically polymerizing organic substance selected from the group consisting of 3,4-epoxycyclohexylmethyl-3',4'-epoxy-cyclohexane carboxylate, trimethylol propane triglycidylether and mixtures thereof;
- (e) at least one cationic polymerization initiator;
- (f) at least one hydroxyl-functional compound; and
- (g) at least one microparticle filler.

In re: Steinmann et al.
Serial No.: 10/644,299
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Page 9

Remarks

This is a second Amendment presented after the date of filing an Appeal Brief pursuant to 37 C.F.R. § 41.33(b). This Amendment is responsive to the Advisory Action mailed June 7, 2007, in the above-referenced application. Applicants note with appreciation the Examiner's comments in the Advisory Action and offer the foregoing amendment to streamline the issues for consideration on Appeal.

Claim 1 is amended to present Claim 11 and Claim 2, from which Claim 11 depends, in independent form. Claims 2 and 11 are accordingly cancelled. Claims 3-10, 12-18 and 20, previously dependent on Claim 2, are amended to depend from Claim 1. Lastly, Claim 21 is also cancelled.

Applicants submit that the amendments comply with 37 C.F.R. § 41.33(b) because the amendments merely cancel a claim without affecting the scope of any other pending claims in this proceeding or rewrite dependent claims (Claims 2 and 11) into independent format. Accordingly, Applicants respectfully request entry of this amendment.

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 50-0332.

Respectfully submitted,

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